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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
08 926,592	09 04 1997	SHUNPEI YAMAZAKI	0756-1717	7227

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NIXON PEABODY LLP
8180 GREENSBORO DRIVE
SUITE 800
MCLEAN, VA 22102

EXAMINER

PERT, EVAN T

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 01 03 2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 08/926,592	Applicant(s) YAMAZAKI, SHUNPEI	
	Examiner Evan T. Pert	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-17 and 19-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-17 and 19-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

Attachment(s)

15. ☐ Notice of References Cited (PTO 800)

16. ☐ Notice of Substantive Examination (PTO 800)

DETAILED ACTION

Election/Restrictions

1. The restriction requirement imposed in paper no. 27 is withdrawn and claims 13-17 and 19-30 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 13-17, 19-21, 23-26 and 28-29 rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. in view of Fujiyama et al..

It was well known long before the 1980s that multiple layers of insulating materials such as silicon nitride, silicon dioxide, PSG, BPSG and so-on are useful in a planar process of building up alternating layers on a semiconductor substrate to make devices. The claims do not require the first and second deposition layers in the claims to be touching, so there could be other layers, such as metallization, that intervene. One of ordinary skill in the art is motivated to make devices by successively laying down multiple layers of different materials with different deposition gasses. This is not novel.

Takagi et al. teach a plasma CVD apparatus wherein the first and second electrodes are parallel, the substrate sits on the first electrode with one substrate side facing the second electrode, and the second electrode has holes in it that pass multiple deposition gasses through the second electrode [col. 1, lines 45-46].

Takagi et al. teach "the method" of using their apparatus can be also used to form silicon dioxide and phosphosilicate glass [col. 6, lines 14-18].

Takagi et al. are silent about the obvious fact that their deposition chamber needs cleaning, but Fujiyama et al. are not. Fujiyama et al. teach "A Method of Cleaning Apparatus for Forming Deposited Film" and teach nitrogen fluoride was a "prior art" cleaning gas in 1984 [col. 1, lines 53-59].

Fujiyama et al. wants to use other than nitrogen fluoride in a plasma-cleaning, though, because NF_3 doesn't work effectively on silicon nitride in which they are interested.

It would have been obvious to have used a cleaning gas as is taught by Fujiyama et al. in the deposition apparatus of Takagi et al. when working with silicon oxide based deposits. One of ordinary skill in the art would be motivated to clean the chamber after build-up of deposits of the deposition material and would naturally introduce cleaning gas after the substrate is removed from the chamber. Such cleaning would necessitate cleaning the upper (second or "other one") electrode 4 in Takagi et al. because the gas inlet pipe 3 is fed right into this electrode

One of ordinary skill in the art would be motivated to deposit 2 different silicon oxide layers for a multi-level interconnect. One of ordinary skill would have been motivated to deposit different layers such as silicon dioxide followed by PSG to get the re-flow benefit of PSG for planarization over a non-planar silicon dioxide insulating layer.

4. Claims 22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. in view of Fujiyama et al. as applied to claims 21 and 26 above, and further in view of Tanaka et al..

Tanaka et al. teach the advantage of photo CVD wherein electromagnetic radiation is used to assist in the reaction. It would have been obvious to build in photo CVD elements to the apparatus of Takagi et al. since the photo CVD advantages taught by Takagi et al. provide motivation to use photo CVD in any deposition apparatus, such as that of Takagi et al. (cleaned by the method taught by Fujiyama et al.).

Response to Arguments

5. Applicant's arguments with respect to claims 13-17 and 19-30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan T. Pert whose telephone number is 703-306-5689. The examiner can normally be reached on M-F (7:00-3:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Bowers can be reached on 703-308-2417. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ETP
June 1, 2001



Charles Bowers
Supervisor